PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Thomas J. Cloonan
Serial No.
Filing Date:

Examiner: K. Harper
Art Group: 2664
Docket No. 04807000029

Title: **CONGESTION CONTROL IN A NETWORK DEVICE HAVING A BUFFER CIRCUIT**

Box Patent Application
Assistant Commissioner for
Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

This is a divisional of U.S. Patent Application Serial No. 09/620,821. The applicant has filed contemporaneously herewith, an amendment to the office action mailed June 6, 2001, (paper no. 4). In light of that amendment, the applicant respectfully requests that this divisional application be amended as follows:

IN THE SPECIFICATION

Add a new paragraph to the specification immediately above line 3 that reads "Field of the Invention" said new paragraph to read as follows:

This is a divisional of application serial no. 09/620,821 filed July 21, 2000, for a "Congestion Control in a Network Device Having a Buffer Circuit" the rights in which are assigned to the assignee of this application.

IN THE CLAIMS

Cancel claims 4-7 without prejudice.

Cancel claims 11-12 without prejudice.

Rewrite claim 13 as follows:

13. (Once amended) An apparatus for controlling the congestion of a buffer circuit, having a depth indication signal, in a data network, the apparatus comprising:

a data rate monitor coupled to the data network input and accepting a stream of data packets, the data rate monitor outputting the stream of data packets and a control signal indicating the service flow's data packet flow rate;

a flow limiter having a data input coupled to the stream of data packets output from the data rate monitor, the flow limiter also having a control input coupled to the control signal from the data rate monitor, the flow limiter outputting the stream of data packets; and

a congestion controller having a data input coupled to the stream of data packets from the flow limiter, the congestion controller also having a first control input coupled to the control signal from the data rate monitor, a second control input coupled to the depth indication signal, and a third control input coupled to a priority signal, the congestion controller controlling the rate at which the stream of data packets enters the buffer circuit in response to the first, second, and third control signals by dropping predetermined data packets from the stream of data packets.

Cancel claims 16-18 without prejudice.

Rewrite claim 19 as follows:

19. (Once amended) A method for a cable modem to communicate with a cable modem termination system, the cable modem being assigned a predetermined service level, the cable modem termination system comprising a buffer circuit for temporarily storing data packets, the method comprising the steps of:

the cable modem and the cable modem termination system performing a ranging step to determine a channel and power level for communication that is acceptable to the cable modem termination system;

the cable modem registering with the cable modem termination system;

the cable modem requesting additional bandwidth beyond the predetermined service level;

communicating data packets from the cable modem to the cable modem termination system;

determining a priority level of the data packets;

determining an average depth of the buffer circuit;

determining a service flow associated with the data packets;

determining a flow rate of the service flow associated with the data packets; and

processing the data packets in response to the average depth of the buffer circuit, the flow rate, and the priority.

Rewrite claim 22 as follows:

22. (Once Amended) A cable modem termination system comprising:

a buffer circuit comprising:

a buffer depth indication signal that indicates the amount of memory not being used;

a cable modem interface comprising:

a plurality of data rate monitors, a first monitor for monitoring a data packet flow rate in an upstream path and a second monitor for monitoring the data packet flow rate in a downstream path, each monitor generating a flow rate indication signal;

a plurality of flow limiters, a first flow limiter, coupled to the first data rate monitor, limiting the flow rate in the upstream path and a second flow limiter, coupled to the second data rate monitor, limiting the flow rate in the downstream path, both flow limiters acting in response to the respective flow rate indication signal; and

a congestion controller, coupled to the first flow limiter, for controlling the flow of data into the buffer circuit in response to the flow rate indication signal, the buffer depth indication signal, and a packet priority signal generated from the data packets; and

an Ethernet interface comprising:

a data rate monitor, coupled to the Internet, for monitoring the data packet flow rate in the downstream path, the data rate monitor generating a flow rate indication signal;

a flow limiter, coupled to the data rate monitor, for limiting the flow rate in the downstream path, the flow limiter acting in response to the flow rate indication signal; and

a congestion controller, coupled to the flow limiter, for controlling the data packets flowing into the buffer circuit in response to the flow rate indication signal, the buffer depth indication signal, and a packet priority signal generated from the data packets.

REMARKS

In the parent application (serial no. 09/620,821) claim 22 was objected to because "cable modem" in the preamble should have been rewritten as - -cable modem termination system- -. Appropriate correction has been taken by the foregoing amendment.

Claim 13 was rejected under 35 USC 112 because of inconsistent language used in line 3 and line 4, which has been corrected by the foregoing amendment.

Claim 16 was rejected under 35 USC 112. Claims 16-18 have been cancelled without prejudice.

Claims 1-2, 8-9 and 13-14 were rejected under 35 USC 102(e) as being anticipated by Kilkki (U.S. Patent No. 6,081,505). The Examiner asserted that Kilkki discloses the various steps recited in claim 22. During a telephone conference with the Examiner on June 19, 2001, the Examiner was asked whether the Kilkki reference discloses the claim 1 step of "determining [a] priority associated with a current data packet" which was not identified by the Examiner in the office action mailed June 6, 2001. Accordingly, it is respectfully submitted that the rejection of claims 1-2, 8-9 and 13-14 under 35 USC 102(e) is improper because the Kilkki reference does not show or

disclose the applicant's claimed step of determining priority levels associated with data packets as recited in these claims.

A careful review of the Kilkki reference revealed that it indeed does not show or suggest the step of determining a priority level associated with each data packet. Indeed, a review of the Kilkki reference shows that it appears to teach away from the applicant's claimed usage of different priority levels for data packets.

In column 2, at lines 28-35 of the Kilkki reference, Kilkki disparages traffic management schemes that use service class parameters, traffic parameters and quality of service parameters and the like. Anyone reading the Kilkki reference would be lead away from including the use of a priority level as recited in claims of the current application.

On page 8 of the current application at line 19, the applicant recites that different data packets are assigned priority levels based upon a customer service plan. Higher-paying customers are assigned a higher level of priority as opposed to customers that pay lower service fees that are assigned lower priorities. The applicant's claimed use of priority levels clearly distinguishes the claimed subject matter from that disclosed in Kilkki. Moreover the applicant submits that unless the Examiner can find another reference that shows or suggests the combination recited in these claims, that any reference that ostensibly shows usage of a priority level will be contrary to the teachings and suggestions of the Kilkki reference.

In light of the foregoing, the applicant submits that claims 1-2, 8-9 and 13-14 are clearly allowable over the Kilkki reference.

Claims 3, 10 and 15 were rejected under 35 USC 103(a) as being unpatentable over Kilkki. The Examiner asserted that the limitations of these dependent claims would have been obvious to one skilled in the art.

As set forth above, Kilkki teaches away from the use of a service level in managing traffic flows through a switch. Accordingly, the applicant submits that the Examiner's rejection of claims 3, 10 and 15 under 35 USC 103(a) was improper. Moreover, in rejecting these claims the Examiner relied entirely upon a hindsight analysis without any support whatsoever in concluding that it would been obvious to one skilled in the art. The applicant respectfully requests that if the Examiner contends it would have been obvious to come up with the subject matter claimed in claims 3, 10 and 15, the Examiner should be able to cite at least one reference in support of his position.

Claims 16-22 were rejected under 35 USC 103(a). Claims 16-18 have been cancelled. As for claim 19 however, the claim clearly recites the step of determining a priority level of the data packets which are as not shown or suggested in any prior art reference. Accordingly, claim 19-21 are considered to be allowable over the prior art of record. For the same reason, claim 22 is considered to be allowable over the prior art because it recites a congestion controller which among other things controls flow of data in response to a packet priority signal from the data packets themselves.

In conclusion, the applicant's claims that recite the usage and inclusion of packet priority levels is not found in any prior art reference cited by the Examiner. Accordingly, allowance of the claims as amended is respectfully requested by the applicant. Should the Examiner wish to contact the undersigned to discuss any aspect of the application, he is invited to do so by contacting the undersigned directly at (312) 609-7536.

Respectfully,

Dated: 7/10/2001

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

13. (Once amended) An apparatus for controlling the congestion of a buffer circuit, having a depth indication signal, in a data network, the apparatus comprising:

a [the] data rate monitor coupled to the data network input and accepting a stream of data packets, the data rate monitor outputting the stream of data packets and a control signal indicating the service flow's data packet flow rate;

a flow limiter having a data input coupled to the stream of data packets output from the data rate monitor, the flow limiter also having a control input coupled to the control signal from the data rate monitor, the flow limiter outputting the stream of data packets; and

a congestion controller having a data input coupled to the stream of data packets from the flow limiter, the congestion controller also having a first control input coupled to the control signal from the data rate monitor, a second control input coupled to the depth indication signal, and a third control input coupled to a priority signal, the congestion controller controlling the rate at which the stream of data packets enters the buffer circuit in response to the first, second, and third control signals by dropping predetermined data packets from the stream of data packets.

19. (Once amended) A method for a cable modem to communicate with a cable modem termination system, the cable modem being assigned a predetermined service level, the cable modem termination system comprising a buffer circuit for temporarily storing data packets, the method comprising the steps of:

the cable modem and the cable modem termination system performing a ranging step to determine a channel and power level for communication that is acceptable to the cable modem termination system;

the cable modem registering with the cable modem termination system;

the cable modem requesting additional bandwidth beyond the predetermined service level;

communicating data packets from the cable modem to the cable modem termination system;

determining a priority level of the data packets;

determining an average depth of the buffer circuit;

determining a service flow associated with the data packets;

determining a flow rate of the service flow associated with the data packets; and

processing the data packets in response to the average depth of the buffer circuit, the flow rate, and the priority.

22. (Once Amended) A cable modem termination system comprising:

a buffer circuit comprising:

a buffer depth indication signal that indicates the amount of memory not being used;

a cable modem interface comprising:

a plurality of data rate monitors, a first monitor for monitoring a data packet flow rate in an upstream path and a second monitor for monitoring the data

packet flow rate in a downstream path, each monitor generating a flow rate indication signal;

a plurality of flow limiters, a first flow limiter, coupled to the first data rate monitor, limiting the flow rate in the upstream path and a second flow limiter, coupled to the second data rate monitor, limiting the flow rate in the downstream path, both flow limiters acting in response to the respective flow rate indication signal; and

a congestion controller, coupled to the first flow limiter, for controlling the flow of data into the buffer circuit in response to the flow rate indication signal, the buffer depth indication signal, and a packet priority signal generated from the data packets; and

an Ethernet interface comprising:

a data rate monitor, coupled to the Internet, for monitoring the data packet flow rate in the downstream path, the data rate monitor generating a flow rate indication signal;

a flow limiter, coupled to the data rate monitor, for limiting the flow rate in the downstream path, the flow limiter acting in response to the flow rate indication signal; and

a congestion controller, coupled to the flow limiter, for controlling the data packets flowing into the buffer circuit in response to the flow rate indication signal, the buffer depth indication signal, and a packet priority signal generated from the data packets.